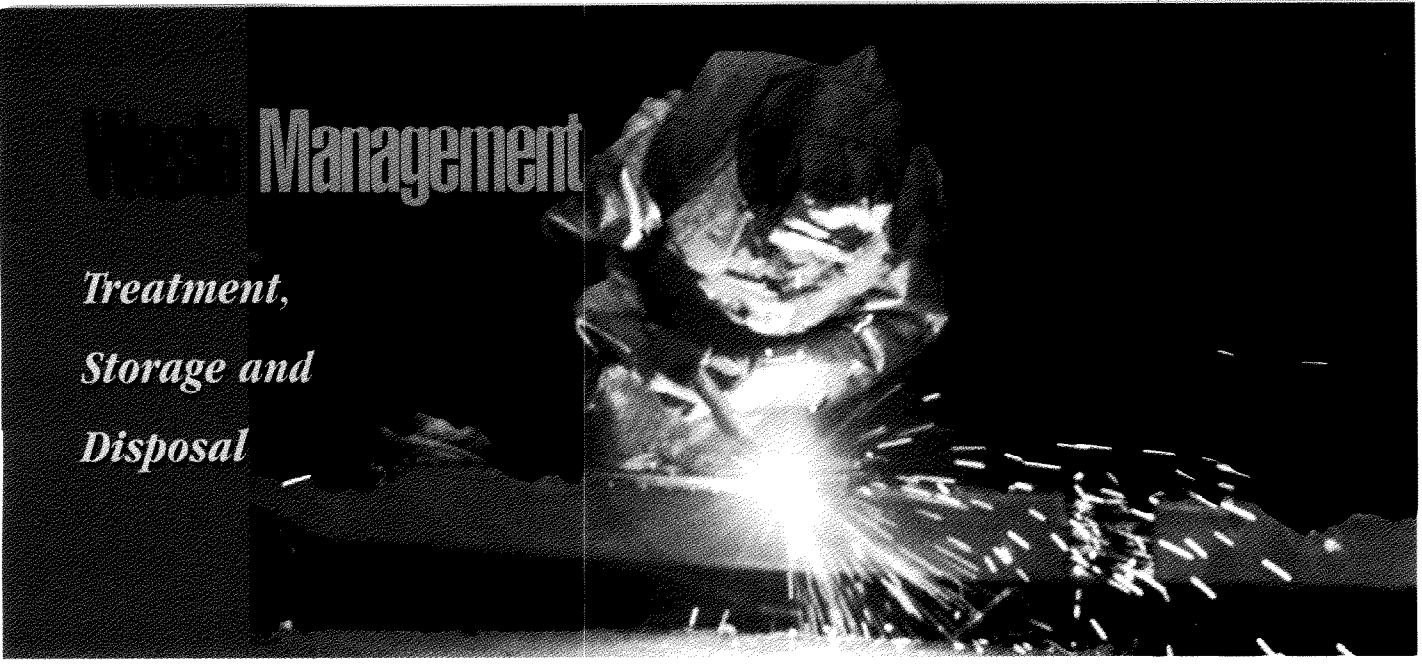


Waste Management

Treatment, Storage and Disposal

The amount of waste in storage at the INEEL was significantly reduced in 2001. Management goals for all waste were exceeded.

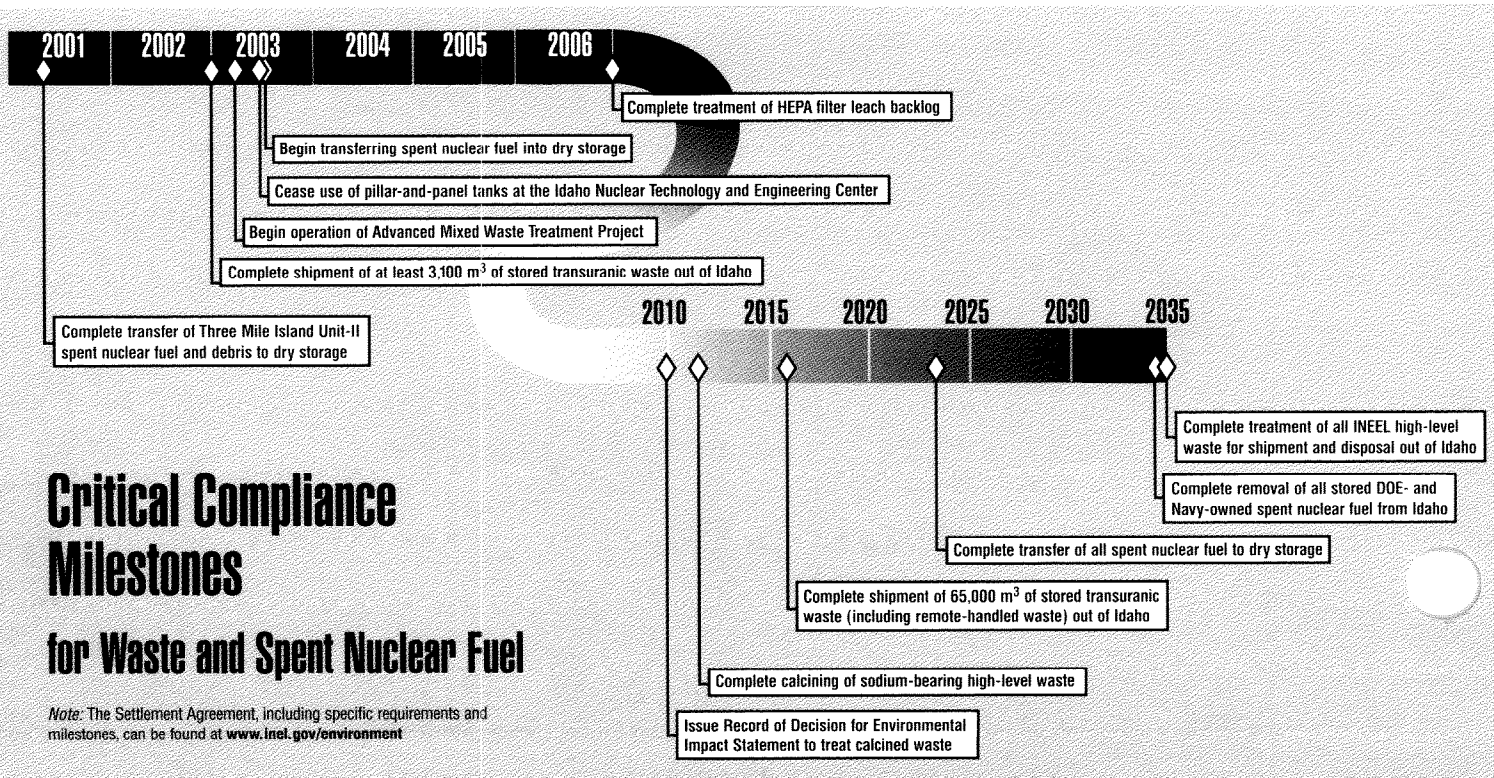
2000 Highlights

- Met all 10 Site Treatment Plan milestones
- Shipped 103 m^3 (13 shipments) of stored transuranic waste to the Waste Isolation Pilot Plant (near Carlsbad, New Mexico)
- Calcined 90,000 gallons of liquid sodium-bearing high-level waste before the calciner was placed in stand-by mode by June 1, 2000 (by agreement with the state of Idaho)
- Treated 811 m^3 and shipped 469 m^3 of mixed low-level waste off-site for disposal
- Treated 2,994 m^3 and disposed of 4,344 m^3 of low-level waste on-site.

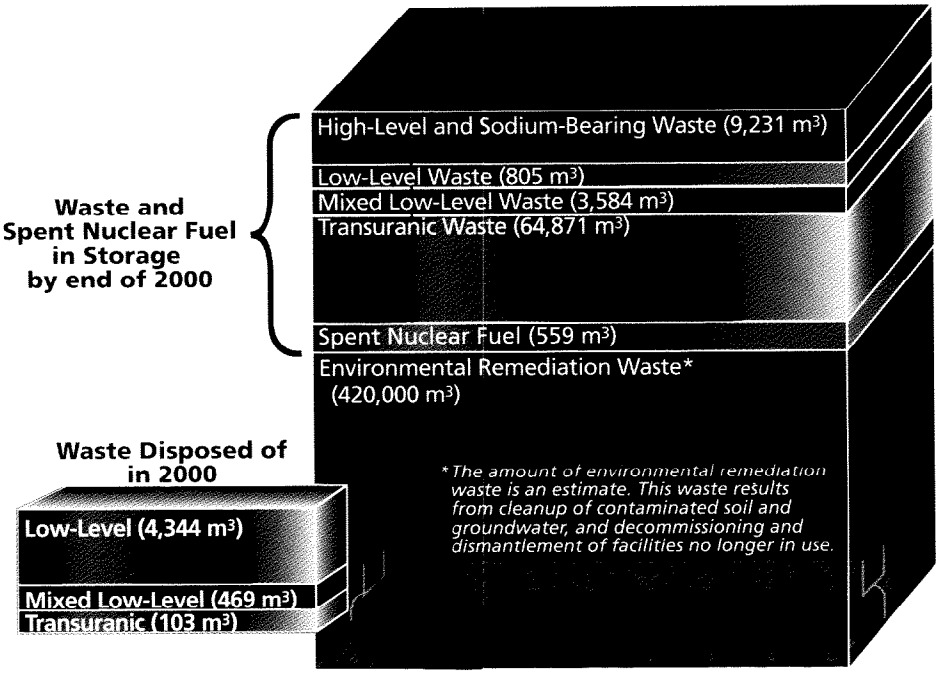
2001 Major Goals

- Meet all 10 Site Treatment Plan milestones
- Meet all 11 Voluntary Consent Order milestones (4 already completed)
- Ship 1,160 m^3 of stored transuranic waste to WIPP for final disposal
- Treat 100 m^3 and ship 400 m^3 of mixed low-level waste off-site for disposal
- Treat 1,200 m^3 and dispose of 3,186 m^3 of low-level waste on-site.

Critical Compliance Milestones for Waste and Spent Nuclear Fuel



Note: The Settlement Agreement, including specific requirements and milestones, can be found at **www.inel.gov/environment**



All the waste at the INEEL would fill an area 330 feet high if it were stacked above a football field.

Spent Nuclear Fuel

The INEEL exceeded its goals for managing DOE's spent nuclear fuel.

2000 Highlights

- Emptied CPP-603 wet storage basins at the Idaho Nuclear Technology and Engineering Center, finishing eight months ahead of the Settlement Agreement milestone
- Treated 105 canisters of Three Mile Island Unit-II spent nuclear fuel to prepare it for transfer to a new dry storage facility.

2001 Goals

- Complete transfer of spent nuclear fuel from Test Area North to dry storage at the Idaho Nuclear Technology and Engineering Center by June (a Settlement Agreement milestone).

What is spent nuclear fuel?

Spent nuclear fuel is fuel that no longer effectively produces energy, typically after several years of use.

A large amount of DOE's spent nuclear fuel is from national defense and other programmatic missions. Most of the fuel stored at the INEEL is at the Idaho Nuclear Technology and Engineering Center.

For several years, spent fuel was reprocessed, chemically separating the uranium or plutonium from the wastes so it could be reused. However, the need for uranium and plutonium decreased. A 1992 decision to stop reprocessing left a large quantity of spent nuclear fuel in storage.

DOE's spent nuclear fuel is stored in both wet and dry storage. Dry storage is preferred because it reduces concerns about corrosion and is less expensive to monitor. An effort is underway to put spent nuclear fuel in temporary dry storage so that it can be quickly readied for transport once a repository is completed.

The INEEL's goal is to begin shipping spent fuel to a national repository by Sept. 30, 2016. The Settlement Agreement requires that all spent nuclear fuel must be out of Idaho by Jan. 1, 2035.

The Agreements Guiding INEEL's Management of Waste and Spent Nuclear Fuel

INEEL Site Treatment Plan

This 1995 plan, approved by the state of Idaho, specifies how DOE will comply with federal law in the management of mixed waste at the INEEL.

Settlement Agreement/ Court Order

This 1995 agreement, between the DOE, U.S. Navy and state of Idaho, resolved the legal disputes regarding the receipt of spent nuclear fuel at the INEEL. The court order specifies milestones and deadlines that will guide the INEEL's management of spent nuclear fuel and many historic radioactive wastes through 2035.

Voluntary Consent Order

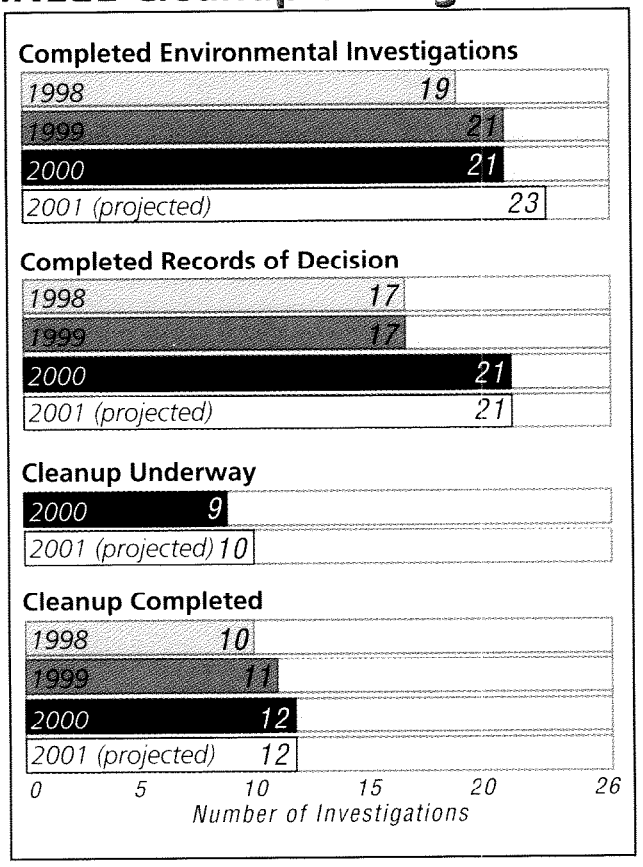
This agreement, signed in June 2000 by DOE officials and the Idaho Division of Environmental Quality, outlines a 19-year schedule for achieving waste compliance in several areas of concern at the INEEL, including the characterization of more than 700 tanks or their ancillary equipment.

Environmental Restoration

Cleaning Up the Environment

Soft-sided waste bags are expected to save the INEEL approximately $2.1 million over the next decade.

INEEL Cleanup through 2000



2000 Highlights

- Met all 14 Federal Facility Agreement/Consent Order milestones
- Began remedial actions at eight release sites identified in a 1999 comprehensive Record of Decision for Test Area North
- Issued a Proposed Plan for the Test Area North contaminated groundwater plume
- Completed remediation of eight release sites identified in the 1997 Test Reactor Area Record of Decision
- Signed a comprehensive Record of Decision for the Central Facilities Area to conduct remedial actions at three release sites
- Signed a comprehensive Record of Decision and began remediation of seven release sites at the Power Burst Facility/Auxiliary Reactor Area.

2001 Major Goals

- Meet all 8 Federal Facility Agreement/Consent Order milestones
- Issue a Record of Decision Amendment for the Test Area North contaminated groundwater plume
- Complete a comprehensive investigation and issue a Proposed Plan for sitewide ecological risk, contaminated surface areas outside facility boundaries and the Experimental Breeder Reactor-I/Boiling Water Reactor Experiment area.

Significant Remediation Progress in 2000

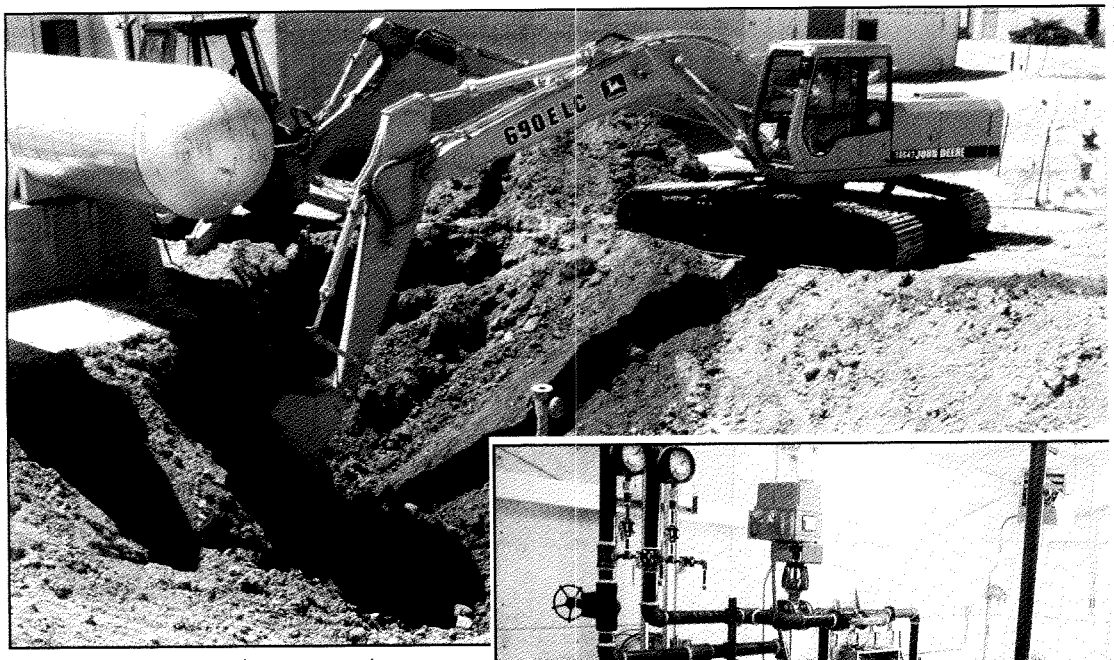
Nuclear research and other operations left behind contaminants at the INEEL that are a potential risk to human health and the environment. To more easily identify and define areas requiring remediation, the Federal Facility Agreement and Consent Order divided the INEEL into ten waste area groups containing 26 investigation areas.

By the end of 2000, 21 of the 26 area investigations were complete with legally binding Records of Decision. Of those remaining, a combined investigation of the Experimental Breeder Reactor-I/Boiling Water Experiment area and contaminated surface areas outside facility boundaries will be completed in 2001 with a Record of Decision expected in 2002. The other investigations still to be completed include:

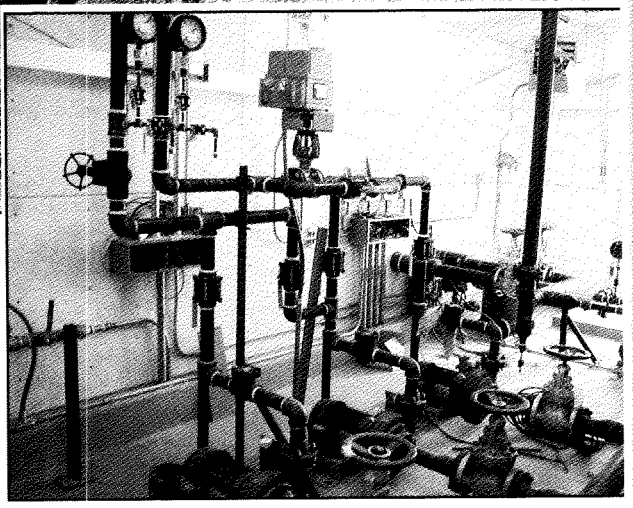
- Buried waste at the Radioactive Waste Management Complex
- Soil and groundwater contamination at the Idaho Nuclear Technology and Engineering Center Tank Farm
- Groundwater and Snake River Plain Aquifer contamination from the INEEL.

Remediation was completed at an additional area at the INEEL in 2000, bringing the total number of remediated areas to 12. Remediation is in progress at nine other areas. Of the ten waste area groups defined by FFA/CO, three are expected to be remediated by 2006.

Remediation processes may require new construction as well as the removal of outdated or unused facilities.



An underground storage tank was removed while remediating the WRRTF facility in Test Area North.



The New Pump and Treat Facility at Test Area North will remove trichloroethene from contaminated groundwater.

The Agreements Guiding INEEL's Remediation Efforts

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

This 1980 federal law, updated in 1986 by the *Superfund Amendments and Reauthorization Act* (SARA), governs the remediation of uncontained hazardous, toxic and radioactive substances.

Federal Facility Agreement and Consent Order (FFA/CO)

This 1991 agreement between the DOE, EPA and state of Idaho established a plan for conducting remedial actions at the INEEL in accordance with the *Comprehensive Environmental Response, Compensation and Liability Act* (CERCLA), *Resource Conservation and Recovery Act* (RCRA), and *Idaho Hazardous Waste Management Act* (HWMA), and sets legally enforceable milestones. As a result of the agreement, the INEEL was divided into 10 waste area groups based on similar characteristics or geographic boundaries. Nine groups correspond to the site's major facility areas; the tenth group includes the aquifer beneath the site and sites outside the boundaries of the INEEL's primary facility areas.

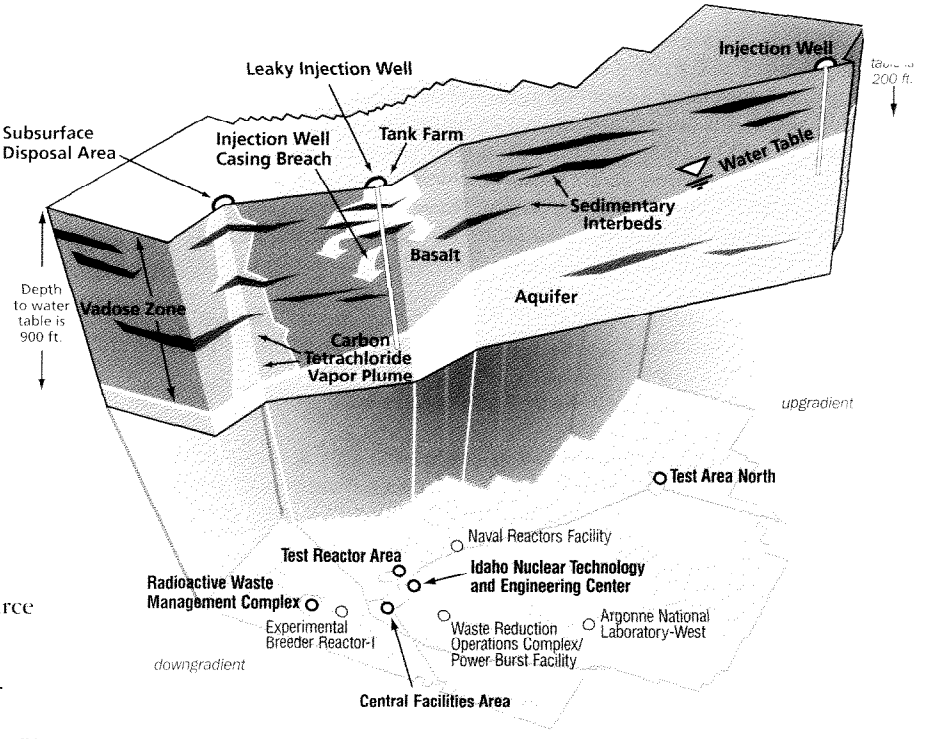
Under the FFA/CO, the DOE, EPA and State conduct an environmental investigation at each area that potentially needs remediation. At the end of each investigation, a Proposed Plan – documenting the results of the investigation and proposing alternative remedial actions – is presented for public comment.

After reviewing and addressing any comments, the DOE, EPA and State reach a final decision, which is documented in a Record of Decision. Remedial action design and construction can then begin.

Focus on Scientific Understanding Improves Efficiency

Applying the best available science to environmental challenges ultimately saves taxpayers' dollars and, within a limited budget, improving scientific understanding is critical to the INEEL's ongoing and future remediation.

Through partnerships with universities, other DOE facilities and private companies here and overseas, the INEEL is expanding and building a science research base that is solving remediation and waste management challenges.



This artist's view shows how the Snake River Plain Aquifer flows downhill from north to south beneath the INEEL. The facilities contributing to groundwater contamination are shown in boldface.

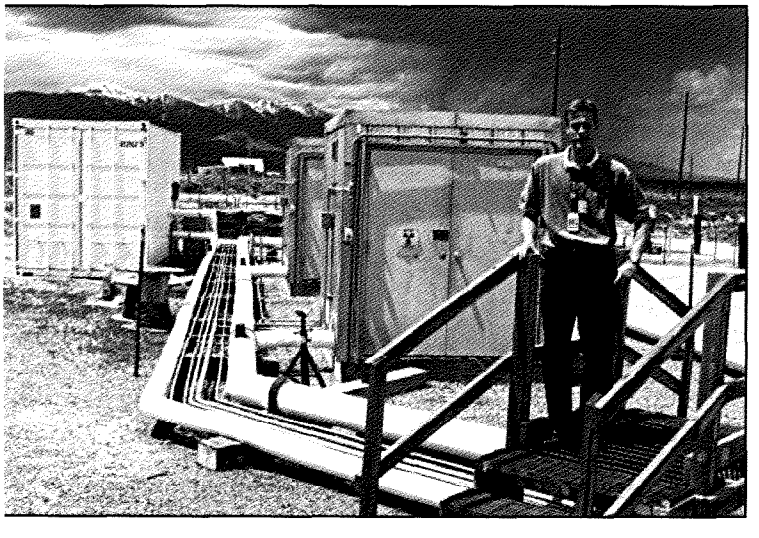
Protecting resources

One of the most important focuses of scientific research at the INEEL is aimed at preserving a basic human requirement – clean drinking water. The eastern Snake River Plain Aquifer, which underlies the INEEL, is the sole source of drinking water for most of the people living in Eastern Idaho. Annually, it supplies approximately 2 billion acre-feet (642 billion gallons) of water for irrigation and industry.

Though most of the water in the eastern Snake River Plain Aquifer requires no chlorination to make it safe to drink, some industrial and agricultural activities have introduced contaminants into the aquifer. One source of contamination is the INEEL.

The DOE is working to remediate the aquifer beneath the INEEL to meet safe drinking water standards, both to protect human health and the environment and to comply with federal and state laws. Contaminated groundwater is not expected to spread beyond the INEEL's boundaries in concentrations exceeding safe drinking water standards.

The INEEL provides scientists and researchers with an excellent outdoor laboratory for studying the subsurface environment and developing innovative ideas. In situ bioremediation, based on one such idea, was developed for use at the INEEL, but has application virtually everywhere in the world.



New technologies continue to show significant results

Remediation is underway to remove contaminants already in the aquifer or moving towards the aquifer. Several activities have shown significant results.

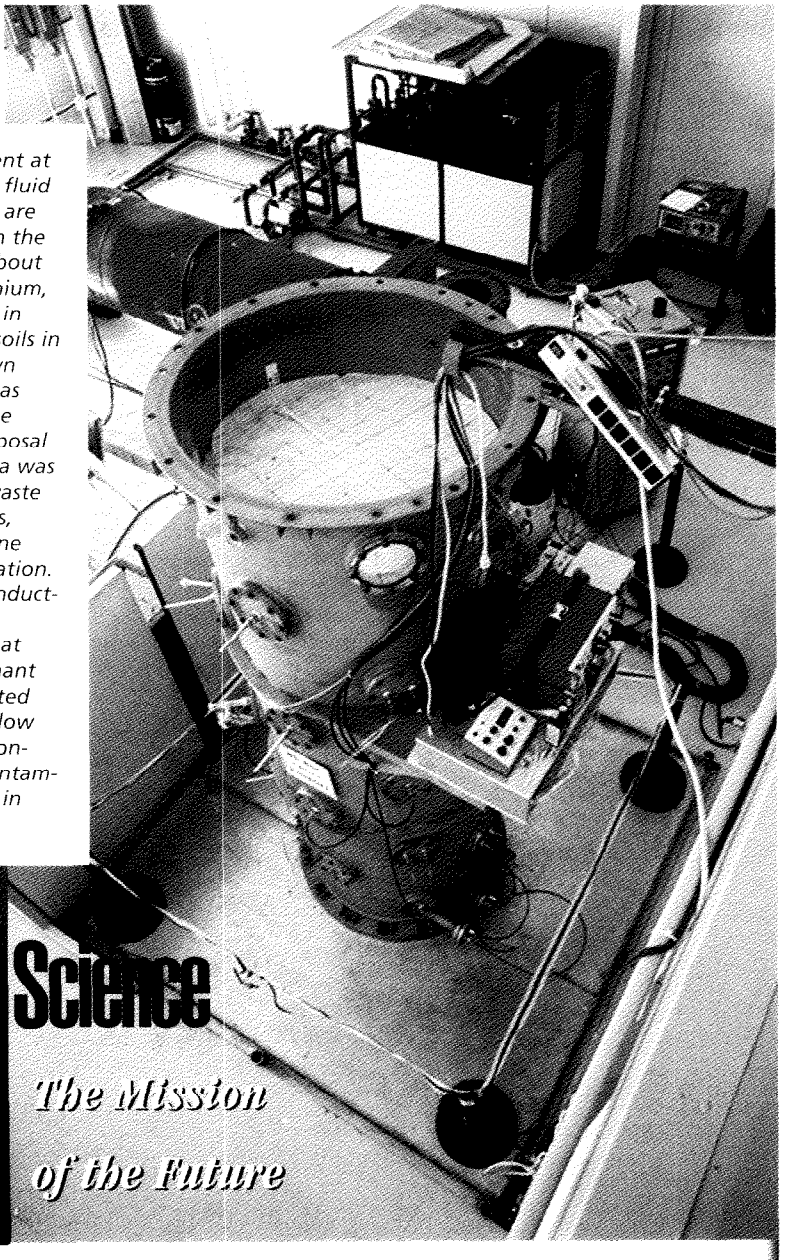
The industrial solvent trichloroethene, which has contaminated the groundwater at Test Area North, is being remediated with a technology called in situ bioremediation. This technology is faster, more effective and less expensive than conventional pump-and-treat systems and degrades the contaminants without bringing them to the surface.

At the Radioactive Waste Management Complex, a vacuum extraction system has removed more than 82,000 pounds of volatile organic compounds from the fractured rock above the aquifer, including more than 50,000 pounds of carbon tetrachloride.

Footnotes

Trichloroethene *is a synthetic liquid primarily used as a solvent to remove grease from metal parts. It can also be found in some household products, including paint removers and adhesives.*

Carbon tetrachloride *is a synthetic liquid that evaporates very easily. In the past, it was widely used as a cleaning fluid, degreasing agent ar fumigant, and was produced in large quantities for the production of refrigeration fluid and aerosol propellants.*



A large-scale experiment at the INEEL studies how fluid flows in soil. Scientists are using the lysimeter (on the right) to learn more about the movement of uranium, tritium and carbon-14 in unsaturated soil. The soils in the lysimeter are drawn from the same source as those used to cover the INEEL's Subsurface Disposal Area. The disposal area was used for radioactive waste for more than 40 years, resulting in vadose zone and aquifer contamination.

Risk assessments conducted at the Subsurface Disposal Area show that carbon-14, a contaminant associated with activated metals, is currently below established levels of concern. However, this contaminant may be an issue in the future.

Subsurface Science

The Mission of the Future

INEEL research focusing on the subsurface

Conceptual design work on the proposed Subsurface Geosciences Laboratory was authorized in 2000. This facility will support the INEEL's Subsurface Science Initiative, a top priority for improving the INEEL's science base. The initiative is a multi-institutional research and development effort that will advance the fundamental understanding of hydrological, geochemical and biological processes affecting contaminant behavior and movement in the earth's subsurface.

In support of this initiative, researchers from the INEEL and around the world have identified a crucial need to conduct scientific experiments at meso- or intermediate scales (where the experiment mimics field processes in a laboratory setting.) At these scales, scientists hope to achieve better understanding of the complex nature of the subsurface.

DOE believes that the understanding gained from meso-scale research will lead to better solutions for its long-term environmental management obligations. Having greater knowledge will improve predictive capabilities and the understanding of environmental risks, leading to more effective remediation, better management of subsurface contamination and greater confidence in the performance of engineered solutions like caps, barriers and long-term disposal facilities.

INEEL Named Long-Term Stewardship Lead

Environmental restoration, waste disposal and facility stabilization activities are expected eventually to be completed at the INEEL and many of DOE's other sites. However, these sites will not be remediated to a standard allowing unrestricted use. Many areas will require monitoring and maintenance to validate and ensure that the actions taken continue to be effective.

Long-term stewardship, including soil and groundwater monitoring, record-keeping and maintenance of containment structures, must continue for decades and more to ensure the protection of human health and the environment. In addition, future scientific and engineering solutions will inevitably result in new opportunities for improving the effectiveness and lowering the costs of existing solutions.

DOE is accountable for the long-term stewardship of its sites. In support of DOE-Idaho's lead role in long-term stewardship, the INEEL will provide the managerial, technical and scientific expertise needed to oversee DOE's long-term environmental management obligations.

Complex-wide environmental management supported

The INEEL has also been asked to take the lead role in identifying ways to simplify and streamline DOE's complex-wide remediation activities. Wastes, contaminants, excess radioactive substances, redundant facilities, use of resources and other environmental management considerations will be looked at from a complex-wide point of view rather than as a single program or site.